Community Mapping of Non-Consumptive Ocean Uses for California's Marine Life Protection Act Initiative
North Central Coast Study Region: Alder Creek/Point Arena to Pigeon Point

Report Submitted by
NOAA National MPA Center and Marine Conservation Biology Institute
November 16, 2007

Background

The State of California is redesigning its system of marine protected areas in accordance with the Marine Life Protection Act (MLPA) of 1999. The MLPA Initiative (MLPAI) is currently undertaking a public planning process in the North Central Coast Study Region (NCCSR) – from Alder Creek just north of Point Arena to Pigeon Point. The MLPA North Central Coast Regional Stakeholder Group is designing alternative proposals for MPAs - based on the best available information - for consideration by the MLPA Blue Ribbon Task Force and ultimately the California Fish and Game Commission.

In addition to ecosystem protection and helping to rebuild depleted species, the protection and enhancement of recreational uses of marine resources is an explicit statutory goal of the MLPA. At the direction of the MLPAI, this project sought to provide socioeconomic information relevant to the MLPA's Goal 3: to improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbances, and to manage these uses in a manner consistent with protection of biodiversity (MLPA, December 6, 2006). To this end, NOAA's Marine Protected Areas Center (MPAC) collaborated with the Marine Conservation Biology Institute (MCBI) to provide to the MLPAI specific quantitative data on the patterns and intensity of four non-consumptive human uses in the NCCSR:

- **Scuba Diving and Underwater Photography**
  - **Includes**: recreational, technical and research diving and snorkeling; photography, videography; dive training, dive charters; educational, scientific and management activities
  - **Excludes**: consumptive activities while diving or snorkeling (other than research or education), such as abalone diving, spear fishing, shell and mineral collection

- **Whale Watching and Wildlife Viewing**
  - **Includes**: surface-or land-based viewing of marine wildlife such as ecotourism operators, commercial boat and aerial viewing, private recreational boat viewing, specific land-based viewing locations (e.g. signed wildlife viewing areas) used to observe wildlife on the ocean.
  - **Excludes**: wildlife encounters incidental to scuba and snorkeling

- **Tide Pooling**
  - **Includes**: users of tide pools and intertidal focal points along rocky shores for naturalist, leisure, scientific collection and educational purposes
  - **Excludes**: consumptive uses such as subsistence harvesters, clam digging, bait harvesters, netting and trapping, aquaria collection and generalized exploration of the rocky shore without reference to specific tide pool areas

- **Kayaking and Canoeing**
    - **Includes**: kayak touring, kayak surfing, wildlife viewing from kayaks, competitive kayak racing, canoe and outrigger activities
    - **Excludes**: consumptive activities conducted from kayaks (e.g. kayak fishing or crabbing) and scuba diving and snorkeling using kayaks solely for transit

Based on a series of mapping workshops, the MPAC-MCBI team worked with the user community to create geographic information system (GIS) maps indicating where the uses occur within the study region, along with spatially explicit information about the intensity of that use. Results have been provided to the MLPAI in hard copy maps and electronic GIS files compatible with current MLPAI spatial data. These maps, and the insight they provide into how people use this part of the state's ocean waters, are intended to inform the ongoing public planning process.

Mapping and Analysis Methods

Data Collection

The project team collected data from people knowledgeable about the four non-consumptive uses listed above in order to document patterns and intensity for each of the targeted uses. Working with members of the MLPA North Central Coast Regional Stakeholders Group (NCCRSG), the MLPA Initiative staff and regional agencies and organizations, informants were identified and invited to participate in the mapping effort. In addition, calls for participants were posted on at least six list servers as well as in places of business catering to the targeted uses, such as dive and kayak shops. Participants with the following characteristics were sought: owners or operators of businesses providing services to participants; education providers and researchers from private non-profit or public institutions; professional service providers with development credentials or certifications; management or enforcement professionals familiar with recreational, uses and access points; and, recreationists avidly engaged in one of these activities. As planned, participants varied widely in expertise and interest. Illustrative examples include: park rangers, kayak club members, SCUBA club leaders, natural area docents and volunteers, resource managers, whale watch vessel captains, and local educators.

Two mapping workshops were held in the NCCSR:

- Half Moon Bay, California on September 11, 2007 with 20 participants;
- Bodega Bay, California on September 12, 2007 with 14 participants.

Each workshop was repeated in an afternoon and evening session to increase opportunities for participation. Additional interviews were conducted with individuals or small groups with a total of nine people unable to attend the workshops over a three day period from September 13 to 15, 2007 in Gualala, California. In addition, four individuals were interviewed remotely and spatial data on uses collected by mail. Overall, 47 people from the NCCSR contributed to the use pattern maps.

Using a combination of paper maps and worksheets, participants provided information on the patterns and intensity of use for the four non-consumptive activities across the NCCSR. Participants were instructed to draw and provide key information about all areas where that use occurs within the NCCSR. The region was divided into six subregional paper maps for ease of display: Alder Creek to Horseshoe Point, Horseshoe Point to Bodega Head, Double Point to Point San Pedro, Bodega Head to Double Point, Point San Pedro to Pigeon Point, and Farallon Islands. The six subregional maps were drawn at 1:150000 scale and plotted at 11x7 tabloid format.

After an introductory session explaining the purpose and overall approach of the exercise, workshop participants reviewed each of the subregional maps and were asked to capture two main aspects of an activity.

1. *Use Patterns* -- Participants identified places on the maps known to be used by members of their respective use group. These places were captured on the maps by drawing polygons encompassing the waters and in some instances, the on-shore access points used for a particular activity. Participants were not limited on the spatial size or configuration of polygons enumerated to represent use patterns.

2. *Intensity of Uses* -- Using the pattern maps created, each participant was asked to consider the relative use intensity for each place mapped. Participants ranked the intensity of use by color coding the polygons as high, medium or low. For this exercise, intensity rankings are considered to reflect some aspects of the area's relative importance to that user community.

Data Processing

For each mapping participant, the resulting maps and mapped use areas were individually reviewed for quality and consistency to facilitate accurate conversion into the digital database. The mapped use areas (polygons) were then digitized into a geodatabase, assigned unique identifiers, and attributed with supplemental qualitative information, including site names, access points, and factors that contribute to site preference by users. Upon completion of digital conversion, the geodatabase records were again compared back to the paper map entries to ensure consistency and quality control.

The data were compiled into one comprehensive data layer and then aggregated into one nautical mile microblocks. For each specific use, the area of each polygon was calculated, as well as the area and count of all individual polygons drawn for that use within each of the NCCSR microblocks. Intensity analysis was conducted by aggregating all the use polygons to the microblock and calculating the area weighted mean of intensity per microblock per use. The data were then compiled into a series of maps as described below.

Results

A total of 47 participants created a total of 209 maps for this project. Of these 47 participants:

- 32 participants mapped 1 use
- 9 participants mapped 2 uses
- 3 participants mapped 3 uses
- 3 participants mapped 4 uses

Diving and underwater photography was mapped by 16 participants, kayaking and canoeing was mapped by 13 participants, whale watching and wildlife viewing was mapped by 24 participants and tide pooling was mapped by 18 participants producing a total of 209 maps.

The following table shows the number of individual maps created for each use in each of the six subregions.

Table 1 Number of individual maps created for each use by subregion

Sub-Region	Diving	Kayaking	Tide Pooling	Wildlife	Total
SR1	13	7	5	11	36
SR2	14	10	13	18	55
SR3	3	8	9	15	35
SR4	4	6	8	13	31
SR5	4	6	10	10	30
SR6	5	2	2	13	22
Total	43	39	47	80	209

After processing all data and aggregating the maps drawn by participants into the microblocks, a total of 16 maps were produced. In order to include a higher level of detail, the NCCSR was broken into two subregions. For each of the four uses, two sets of maps are provided.

1. The first simply shows how many times a specific area of the ocean was identified as being used in the specific non-consumptive activity being mapped – presented as the count of user mapped polygons per microblock.
2. The second set of maps shows the pattern of intensity for the same areas – presented as the area weighted mean of intensity values provided by participants for each use area. Combined, these perspectives on use patterns provide insight into where the four non-consumptive uses are pursued in the NCCSR and the relative intensity of those uses across the region.

Data Considerations

This report and accompanying map products are intended to provide a better understanding of the patterns of human use for the four specified non-consumptive uses in the NCCSR to support MPA planning. Following are some inherent limitations to consider when using this dataset.

Informants

These data were derived from expert volunteers for each use within the study region. While this group was carefully selected, it does not necessarily reflect all points of view or knowledge within the entire use community. Moreover, given the design of the study and the travel distances involved in attending any coastal workshop in the NCCSR, this sample of participants cannot be extrapolated to greater population of the study area, nor can inferences be drawn about use patterns among local users.

Spatial Coverage

In analyzing the use patterns, it is important to note that not all the workshop participants provided use information for all six NCCSR subregions, as their knowledge was often limited to specific geographic regions with which they were most familiar. In addition, some participants mapped more than one use in the region, thereby effectively increasing the sample size of uses and areas mapped.

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